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मानक

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Mazdoor Kisan Shakti Sangathan

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Jawaharlal Nehru

“Step Out From the Old to the New”

IS 6755 (1980): Double coil helical spring washers [PGD 31: Bolts, Nuts and Fasteners Accessories]



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Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”

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Indian Standard

SPECIFICATION FOR DOUBLE COIL HELICAL SPRING WASHERS

(First Revision)

1. Scope — Covers the requirements for double coil helical spring washers in the size range 4 to 36 mm.

2. Dimensions — Shall be as given in Table 1.

3. Material — The spring washers shall be made from suitable grade, according to IS : 4072-1975 'Specification for steel for spring washers (first revision)', having a minimum tensile strength of 700 N/mm² after normalizing and at least 15 percent elongation (gauge length = $5.65 \sqrt{A}$, where A is area of cross section) when tested in accordance with IS : 1521-1972 'Methods for tensile testing of steel wire'.

4. Heat Treatment — The spring washers after coiling shall be suitably heat-treated so as to result in the finished washer having a hardness in the range of 43 to 50 HRC when tested in accordance with IS : 1586-1968 'Methods for Rockwell hardness test (B and C scales) for steel (first revision)'.

5. Finish — The spring washers shall be supplied in natural finish unless otherwise specified by the purchaser. At the request of the purchaser, washers may be phosphate coated, nickel plated, tinned, galvanized, copper plated or cadmium plated. The functional properties of the spring washers shall not be impaired as a result of the protective coatings. The spring washers when coated, shall be subjected to appropriate treatment to avoid hydrogen embrittlement.

Note — A list of Indian Standards on metallic finishes and coatings on steel including the methods of test is given in Appendix A.

6. Accuracy — The chamfered ends of the spring washers shall not increase the diameter when the washer is compressed. The washers shall not interlink.

7. Designation — The spring washers shall be designated by the nominal size, the number of this standard and the surface protection, if any.

Example:

A double coil helical spring washer having a nominal size 10 mm with phosphate coating shall be designated as:

Spring Washer 10 IS : 6755 Phosphate Coated

7.1 In case the spring washer is intended for use with left hand threads, the designation shall be modified as follows:

Spring Washer LH 10 IS : 6755 Phosphate Coated

8. General Requirements — The flat faces of the spring washer and the inner and outer peripheries shall be smooth and free from knurling serrations, die marks, deep scratches, etc, although slight free roll marks shall be permissible.

8.1 The spring washer shall also be free from burrs, rust, pit marks and loose scale. The internal and external circumferential edges shall be rounded sufficiently to avoid checks.

8.2 The spring washers shall be cranked in such a manner that the washer lies flat when closed under compression.

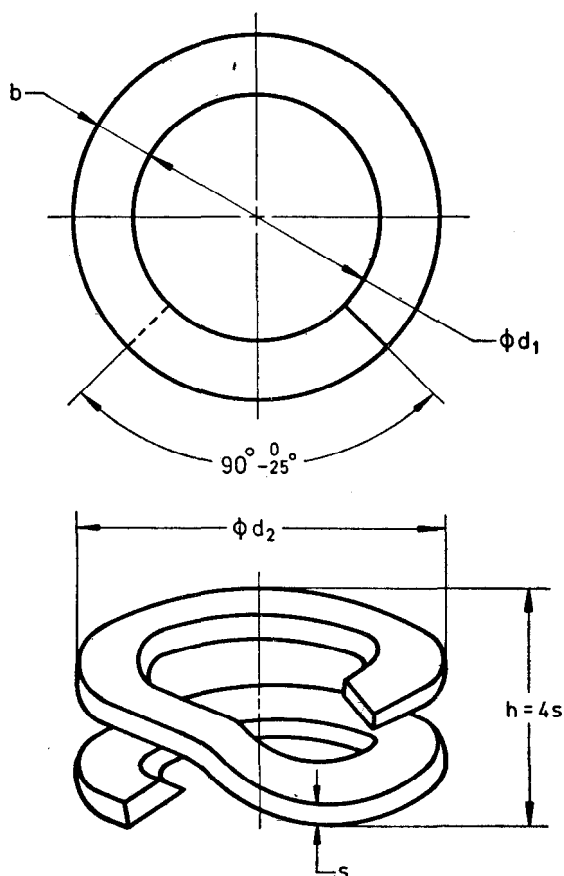
8.3 During use the spring washers shall remain circular and their section shall be such as not to cause them to spread, when set down by a nut under normal service conditions.

8.4 In regard to other requirements, not covered in this standard, the spring washers shall conform to precision grade of IS : 5369-1975 'General requirements for plain washers and lock washers (first revision)'.

TABLE 1 DIMENSIONS FOR DOUBLE COIL HELICAL SPRING WASHERS

(Clause 2)

All dimensions in millimetres.

**Note** — The spring washer shown is for use with right hand threads.

Nominal Size	Internal Diameter d_1		Outside Diameter d_2 Nom	Width b		Thickness s Nom	For Bolt Diameter
	Nom	Tol		Nom	Tol \pm		
4	4.1	+0.3	7.1	1.5	0.1	0.8	M4
5	5.1	+0.3	8.7	1.8	0.1	0.8	M5
6	6.1	+0.4	11.1	2.5	0.15	1	M6
8	8.2	+0.4	14.2	3	0.15	1.2	M8
10	10.2	+0.6	17.2	3.5	0.2	1.2	M10
12	12.2	+0.8	20.2	4	0.2	1.6	M12
16	16.2	+1.0	26.2	5	0.2	2	M16
20	20.2	+1.0	32.2	6	0.2	2.5	M20
24	24.5	+1.0	38.5	7	0.25	3	M24
30	30.5	+1.3	46.5	8	0.25	3	M30
36	36.5	+1.3	56.5	10	0.25	3	M36

9. Sampling — Sampling size and acceptance criteria shall be determined in accordance with IS : 6821-1973 'Methods for sampling of non-threaded fasteners'.

10. Tests

10.1 Compression Test — The spring washers shall be loaded with the following weights for three minutes:

Nominal Size mm		Load (N)
Above	Up to and including	
—	4	200
4	6	500
6	12	1 000
12	20	2 000
20	30	3 000
30	—	5 000

After release of load, the free height of the spring washer shall not be less than three times the sectional thickness.

10.1.1 The above application and removal of load shall be repeated twenty times in quick succession after which the free height shall not have been further reduced.

10.2 Twist Test

10.2.1 The spring washer shall be broken into two equal halves and both the halves shall be tested separately as a single coil washer as described in **10.2.2**.

10.2.2 A portion of the spring washer shall be gripped in vice jaws and then equal portion shall be gripped in wrench jaws as shown in Fig. 1 (edges of the wrench jaws should be sharp and parallel to vice jaws). The wrench shall then be rotated in a direction that increases the free height of the spring washer till the washer is twisted through an angle of 90° . It shall be slowly and evenly bent (not jerkily) taking precaution to prevent injuries through fly splitters. The spring washer shall show no signs of fracture.

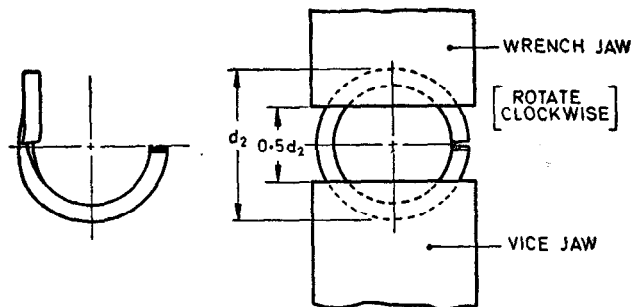


FIG. 1 TWIST TEST

10.2.3 The spring washer shall be notched and then fractured. The fractured ends shall appear evenly grained and without any cracks.

11. Packing — Unless otherwise specified, spring washers shall be packed in carton of 100, 500 and 1 000. Each carton shall contain spring washers of one size only.

12. Marking — Each carton shall be marked with the manufacturer's name or trade mark, nominal size, quantity of spring washers and particulars of coating/plating, if any.

12.1 ISI Certification Marking — Details available with the Indian Standards Institution.

APPENDIX A

LIST OF RELEVANT INDIAN STANDARDS ON METALLIC FINISHES AND COATINGS ON STEEL

IS : 1068-1968	Electroplated coatings of nickel and chromium on iron and steel (<i>first revision</i>)
IS : 1359-1977	Electroplated coatings of tin
IS : 1572-1968	Electroplated coatings of cadmium on iron and steel (<i>first revision</i>)
IS : 1573-1970	Electroplated coatings for zinc on iron and steel (<i>first revision</i>)
IS : 1772-1973	Electroplated coatings of copper (<i>first revision</i>)
IS : 3202-1965	Code of practice for climate proofing of electrical equipment
IS : 3618-1966	Phosphate treatment of iron and steel for protection against corrosion
IS : 6012-1970	Method for measurement of coating thickness by eddy current

EXPLANATORY NOTE

Double coil helical spring washers made of steel are for use with bolts and nuts intended for automobile and general engineering purposes. These washers provided not only the necessary reactive pressure to meet most service conditions but also provide reactive resiliency to prevent frozen bolted assembly conditions.

This standard was first issued in 1972. In the present revision the following changes have been made:

The clause on cranking had been found to be contradictory to the stipulation that the spring washers be evenly wound with uniform pitch and without sharp ends. Hence the latter stipulation has been deleted. Also deleted is the requirement that ends of washers should not abutt when the washers are in a closed condition since for double coil washers the above condition does not arise.

The figure of washer has been modified to one that is used with right hand threads. The included angle between the two ends has been specified with tolerance.

The material for spring washers has also been modified in line with the revised Indian Standard on the subject.